

# Ocean Abundance Projections and Prospective Harvest Levels for Klamath River Fall Chinook, 2002 Season

Klamath River Technical Advisory Team  
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## Preface

The new cohort analysis results were used in forecasting ocean abundance for the 2002 management year. Because the new Klamath Ocean Harvest Model (KOHM) requires as input age-specific forecasts of ocean abundance on Sept. 1 of the previous year (to more directly account for fall ocean fisheries), the abundance forecasts provided in this report refer to this Sept. 1 date. All historic data presented in this report have been adjusted to be consistent with the Sept. 1 reference point.

## Summary

Ocean abundance and percent natural predictor performance for 2001 was:

2001 Predictor Performance

Age	Abundance			Percent Natural		
	Preseason	Postseason	Pre/Post	Preseason	Postseason	Pre/Post
3	187,200	485,700	0.39	0.63	0.57	1.10
4	247,000	142,200	1.74	0.63	0.61	1.03
5	1,200	300	4.84	0.63	0.90	0.70
	435,400	628,100	0.69			

The estimated 2001 age-four ocean harvest rate is 9%; it was forecasted preseason to be 14%.

The 2002 forecasts of ocean stock abundance and percent natural fish are:

2002 Forecast

Age	Abundance	Percent Natural
3	209,000	0.62
4	143,800	0.61
5	9,700	0.65
	362,500	

Absent ocean and river fisheries in 2002, the forecast ocean abundance would be expected to result in 94,800 fish maturing and returning to the basin in 2002 to spawn as adults in natural areas. The maximum permissible spawner reduction rate (SRR) of 0.67 would thus be expected to result in fewer than 35,000 naturally spawning adults. The SRR in 2002 must be less than 0.63 to yield at least 35,000 naturally spawning adults.

Assuming: (a) the 2002 ocean abundance forecast; (b) the 2001 ocean fishery seasons and quotas; (c) the 2001 river recreational allocation of 39.5% of the nontribal harvest; and (d) 50% of the total harvest allocated to the river tribes; the KOHM forecasts a spawning population of approximately 59,000 adults, of which 36,800 would be expected to spawn in natural areas. The total harvest projected by the KOHM under this scenario would be 98,000 adults (tribes 49,000; river recreational 19,300; ocean commercial 23,600; ocean recreational 6,000), with an age-four ocean harvest rate of 12.9%. This projection is provided for comparative purposes only; the Pacific Fishery Management Council (PFMC) will adopt 2002 ocean salmon fishery management regulations in April, 2002.

## **Introduction**

The PFMC's (1988) framework management plan for Klamath River fall chinook (Amendment 9) permits a natural spawner reduction rate via fisheries of no more than 0.67, with a minimum escapement of 35,000 natural spawning adults (Prager and Mohr 2001). Naturally spawning adult fish are defined as age-three or older fall chinook that spawn outside of the hatchery environment, regardless of their origin. The KOHM is used by the PFMC to forecast the impacts of ocean and river fisheries on Klamath River fall chinook, and to evaluate whether a given management option is expected to meet the management plan's biological goals for Klamath River fall chinook. The KOHM requires forecasts of Klamath River fall chinook ocean abundance and percent natural spawners by age, and this report presents these forecasts for management year 2002. For comparative purposes, KOHM forecasts of harvest and spawner escapement are also presented assuming the 2002 ocean abundance and percent natural forecasts are coupled with the 2001 management year regulations. Historical records of ocean abundance, harvest, harvest rates, river escapement, and predictor performance are also compiled.

## **Data and Analytical Methods**

Klamath River fall chinook contribute to ocean and river fisheries primarily as age-three and age-four fish and, to a lesser extent, as age-two and age-five fish. This report develops ocean abundance predictions for all adult age classes (age-three, -four, and -five). The age-composition of the 2001 river run of Klamath fall chinook salmon used in this report is derived from an analysis by the KRTAT (2002).

### Ocean Abundance Forecast

The age-specific ocean abundance predictors are based on the use of "sibling regression". The age  $a$  Sept. 1 ocean abundance estimates for brood years 1979–1997 were regressed against the age  $a-1$  river run-size estimates of their respective cohorts (Table 1, Figure 1). By convention, Sept. 1 is the date that immature Klamath River fall chinook remaining in the ocean are incremented one year in age. The regressions were fit using least-squares with the y-intercept constrained to zero, which gives the biologically reasonable expectation that an age  $a-1$  river run-size of zero predicts an age  $a$  ocean abundance of zero. This procedure is consistent with recommendations of the PFMC's Salmon Technical Team (STT), and Scientific and Statistical Committee (SSC).

Ocean abundance has been forecast preseason since 1985 using methods similar to those described above (Tables 2 and 3). Postseason ocean abundance estimates were calculated using cohort reconstruction methods that accommodate spatial and/or temporal variations in maturity, straying, and fishery impact rates applied separately to the hatchery and natural components of the stock. The postseason estimates for 2000 (age-three) and 2001 (age-three, age-four) are preliminary, as their respective cohorts are incomplete (Table 1).

The 2001 age-three abundance forecast was 0.39 times its postseason estimate (Table 2). Preseason forecasts have underestimated age-three abundance in eight of the seventeen previous years, and have overestimated it in nine. The 2001 age-four abundance forecast was 1.74 times its postseason estimate (Table 2). Preseason forecasts have underestimated age-four abundance in seven of the seventeen previous years, and have overestimated it in ten. The 2001 age-five abundance forecast was 4.84 times its postseason estimate (Table 2). Preseason forecasts have underestimated age-five abundance in ten of the fifteen previous years, and have overestimated it in five.

### Proportion of Natural Spawners Forecast

The age-specific proportion of natural spawners is also forecast using "sibling regression". In this case, the age  $a$  observed proportion natural for calendar years 1996–2001 were regressed against the age  $a-1$  observed proportion natural of their respective cohorts (Table 4, Figure 2). Data for calendar years prior to 1996 were not used because: (1) at this time the hatcheries did not always have an "open-door" policy

(some fish were denied entry into the hatcheries and presumably spawned in natural areas); and (2) the proportion natural time-series (Figure 2a) indicates a “shift-point” near 1995–1996. The regressions were fit using ordinary least-squares for age-three and age-four. For age-five, the slope of the relationship was insignificant, and the arithmetic mean was used as the predictor.

The 2001 predictor for the proportion natural was the arithmetic mean of the previous five years’ age-aggregated observed proportions. The 2001 forecast was 0.63 (PFMC 2001). The post-season estimate was 0.57, 0.61, 0.90, for age-three, -four, and -five fish, respectively, and 0.59 for adults as a whole (Table 4).

#### Historical Harvest Levels and Rates

Historical (1986–2001) ocean and river harvest levels and rates of age-three and age-four Klamath River fall chinook are listed in Table 5.

#### **2002 Forecasts**

The 2002 forecasts of ocean stock abundance and percent natural fish are (Figures 1-2):

Age	2002 Forecast	
	Abundance	Percent Natural
3	209,000	0.62
4	143,800	0.61
5	9,700	0.65
	362,500	

Absent ocean and river fisheries in 2002, the forecast ocean abundance would be expected to result in 94,800 fish maturing and returning to the basin in 2002 to spawn as adults in natural areas. The maximum permissible spawner reduction rate (SRR) of 0.67 would thus be expected to result in fewer than 35,000 naturally spawning adults. The SRR in 2002 must be less than 0.63 to yield at least 35,000 naturally spawning adults.

Landings of Klamath River fall chinook taken in the ocean fisheries after August 2001 (Sept.–Nov.) totaled 2,262 fish (Table 6). These fall landings will be deducted from the ocean fisheries harvest allocation in 2002, and the associated harvest impacts will be deducted from the Sept. 1 ocean abundance forecasts.

Assuming: (a) the 2002 ocean abundance forecast; (b) the 2001 ocean fishery seasons and quotas; (c) the 2001 river recreational allocation of 39.5% of the nontribal harvest; and (d) 50% of the total harvest allocated to the river tribes; the KOHM forecasts a spawning population of approximately 59,000 adults, of which 36,800 would be expected to spawn in natural areas. The total harvest projected by the KOHM under this scenario would be 98,000 adults (tribes 49,000; river recreational 19,300; ocean commercial 23,600; ocean recreational 6,000), with an age-four ocean harvest rate of 12.9% (Appendix A). This projection is provided for comparative purposes only; the PFMC will adopt 2002 ocean salmon fishery management regulations in April, 2002.

#### **Literature Cited**

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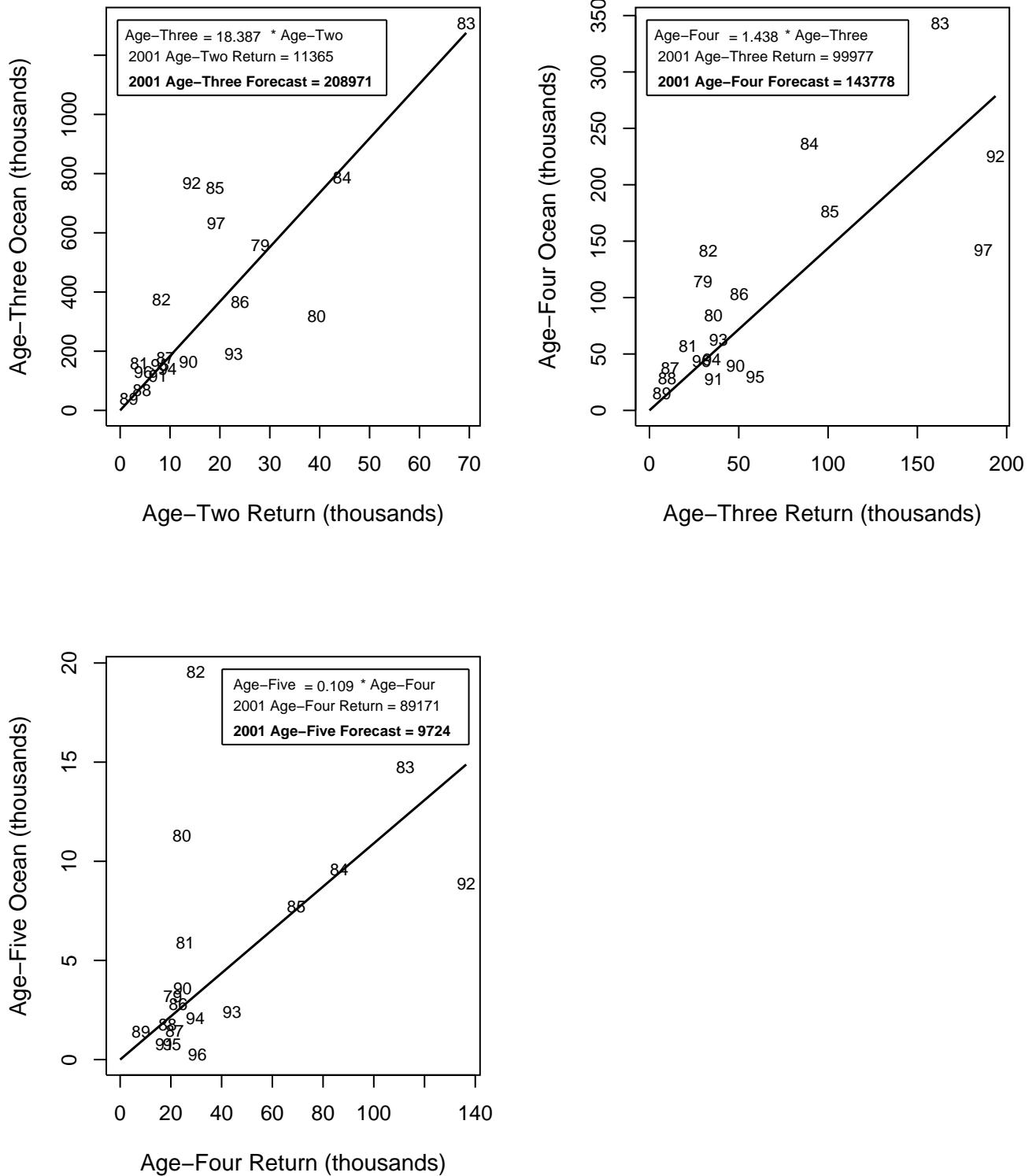


Figure 1. Regression estimators for Klamath River fall chinook ocean abundance (Sept. 1) based on that year's river return of same cohort. Numerals in plots denote brood years.

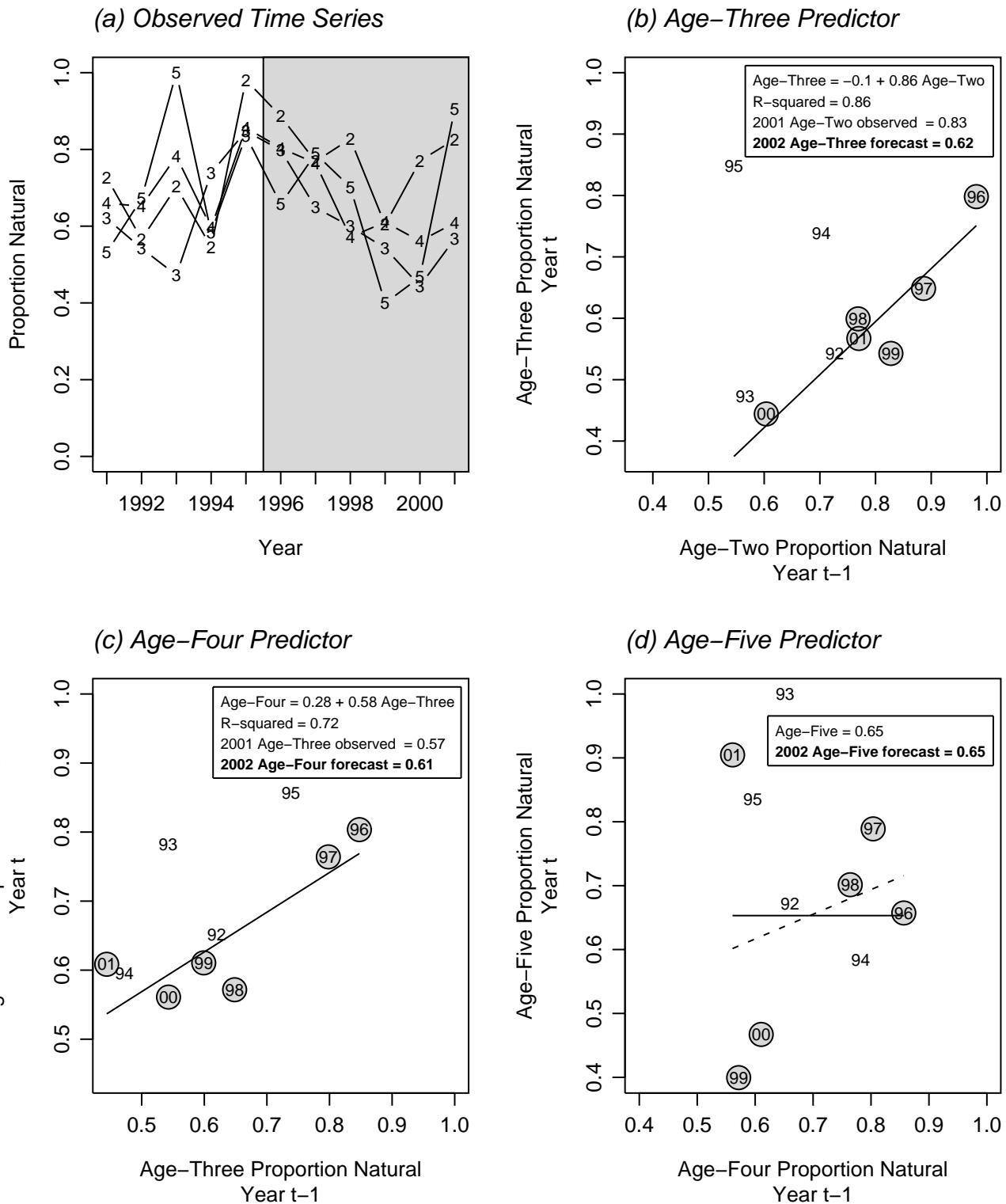


Figure 2. Age-specific proportion of natural spawners. Panel (a): observed time-series; numbers in plot denote age; shaded area depicts data used for predictors. Panels (b)–(d): age-specific predictors based on previous-year observed proportion for same cohort; numbers in plots denote years 1992–2001; shaded circles indicate years used for predictor; age-three and age-four are regression predictors; age-5 predictor is arithmetic mean.

Table 1. Klamath River fall chinook estimated ocean abundance (thousands), ocean harvest rate, and river-run size (thousands) by age.

Year (t)	Ocean Abundance Sept. 1 (t-1)			Annual Ocean Harvest Rate Sept 1 (t-1) - Aug 31(t)		Klamath Basin River Run (t)				
	Age-3	Age-4	Total	Age-3	Age-4	Age-2	Age-3	Age-4	Age-5	Total Adults
1981	493.2	57.0	550.2	0.21	0.53	28.1	64.0	14.3	1.8	80.1
1982	557.5	133.4	690.9	0.30	0.52	39.4	30.0	33.9	2.6	66.5
1983	318.0	113.9	432.0	0.19	0.60	3.8	35.8	20.7	0.9	57.5
1984	157.5	84.1	241.6	0.08	0.38	8.3	21.7	24.4	1.1	47.1
1985	375.2	57.0	432.2	0.11	0.25	69.4	32.9	25.6	5.8	64.4
1986	1308.9	141.3	1450.2	0.18	0.46	44.5	162.7	29.8	2.3	194.8
1987	786.5	343.4	1129.9	0.16	0.43	19.0	89.6	112.4	6.8	208.8
1988	750.5	236.2	986.7	0.20	0.39	24.0	101.0	86.4	3.9	191.3
1989	367.0	176.3	543.3	0.15	0.36	9.1	50.3	69.4	4.3	124.0
1990	177.6	103.1	280.7	0.30	0.55	4.4	11.6	22.9	1.3	35.8
1991	69.6	37.3	106.8	0.03	0.18	1.8	10.0	21.5	1.1	32.6
1992	39.4	28.2	67.6	0.02	0.07	13.7	6.9	18.7	1.0	26.7
1993	164.7	15.0	179.7	0.05	0.16	7.6	48.3	8.2	0.7	57.1
1994	116.1	39.6	155.7	0.03	0.09	14.4	36.0	24.6	1.0	61.6
1995	767.7	27.6	795.3	0.04	0.13	22.8	193.8	17.5	2.4	213.7
1996	190.3	225.2	415.5	0.05	0.16	9.5	38.7	136.4	0.3	175.4
1997	140.3	62.8	203.1	0.01	0.06	8.0	35.0	44.1	4.6	83.6
1998	154.3	44.8	199.1	0.00	0.09	4.6	59.2	29.6	1.7	90.6
1999	128.8	30.1	158.9	0.01	0.09	19.2	29.1	20.5	1.3	50.9
2000	631.5 <sup>a/</sup>	44.0	675.5	0.06 <sup>a/</sup>	0.10	10.2	186.9	30.4	0.5	217.9
2001	485.7 <sup>b/</sup>	142.2 <sup>a/</sup>	627.9	----	c/ <sup>a/</sup>	0.09 <sup>a/</sup>	11.4	100.0	89.2	0.2
										189.3

a/ Preliminary: incomplete cohort data (age- 5 data unavailable).

b/ Preliminary: incomplete cohort data (age-4 and age-5 unavailable).

c/ Not Estimated: incomplete cohort data (age-4 and age-5 unavailable).

Table 2. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall chinook. (Page 1 of 2).

Year (t)	Preseason Forecast Sept 1 (t-1)	Postseason Estimate Sept 1 (t-1)	Pre/Postseason
<b>Age-Three</b>			
1985	113,000	276,000	0.41
1986	426,000 <sup>a/</sup>	1,308,886	0.33
1987	511,800	786,492	0.65
1988	370,800	750,479	0.49
1989	450,600	367,039	1.23
1990	479,000	177,632	2.70
1991	176,200	69,558	2.53
1992	50,000	39,407	1.27
1993	294,400	164,687	1.79
1994	138,000	116,131	1.19
1995	269,000	767,678	0.35
1996	479,800	190,251	2.52
1997	224,600	140,261	1.60
1998	176,000	154,273	1.14
1999	84,800	128,830	0.66
2000 b/	349,600	631,498	0.55
2001 <sup>b/</sup>	187,200	485,710	0.39
<b>Age-Four</b>			
1985	56,875	57,500	0.99
1986	66,250	141,314	0.47
1987	206,125	343,391	0.60
1988	186,375	236,238	0.79
1989	215,500	176,281	1.22
1990	50,125	103,115	0.49
1991	44,625	37,265	1.20
1992	44,750	28,223	1.59
1993	39,125	14,972	2.61
1994	86,125	39,558	2.18
1995	47,000	27,591	1.70
1996	268,500	225,233	1.19
1997	53,875	62,830	0.86
1998	46,000	44,792	1.03
1999	78,750	30,065	2.62
2000	38,875	44,031	0.88
2001 <sup>b/</sup>	247,000	142,157	1.74

a/ A scalar of 0.75 was applied to the jack count because, (1) most jacks returned to the Trinity River, and (2) the jack count was outside the database range.

b/ Preliminary.

Table 2. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall chinook. (Page 2 of 2)

Year (t)	Preseason Forecast Sept 1 (t-1)	Postseason Estimate Sept 1 (t-1)	Pre/Postseason
<b>Age-Five</b>			
1985 c/	—	11,276	---
1986 c/	—	5,884	---
1987	5,250	19,536	0.27
1988	13,250	14,724	0.90
1989	10,125	9,593	1.06
1990	7,625	7,709	0.99
1991	1,500	2,780	0.54
1992	1,250	1,445	0.87
1993	1,125	1,763	0.64
1994	500	1,421	0.35
1995	2,000	3,570	0.56
1996	1,125	786	1.43
1997	7,875	8,865	0.89
1998	3,250	2,383	1.36
1999	2,000	2,094	0.96
2000	1,375	779	1.77
2001	1,250	258	4.84
<b>Total Adults</b>			
1985 c/	---	344,776	---
1986 c/	---	1,456,084	---
1987	723,175	1,149,419	0.63
1988	570,425	1,001,441	0.57
1989	676,225	552,913	1.22
1990	536,750	288,456	1.86
1991	222,325	109,603	2.03
1992	96,000	69,075	1.39
1993	334,650	181,422	1.84
1994	224,625	157,110	1.43
1995	318,000	798,839	0.40
1996	749,425	416,270	1.80
1997	286,350	211,956	1.35
1998	225,250	201,448	1.12
1999	165,550	160,989	1.03
2000 b/	389,850	676,308	0.58
2001 b/	435,450	628,125	0.69

b/ Preliminary.

c/ Age-5 preseason ocean abundance forecast unavailable.

Table 3. Summary of management objectives and predictor performance for Klamath River fall chinook.

Year(t)	Preseason Ocean Abundance Forecast Sept 1 (t-1)		Postseason Ocean Abundance Estimate Sept 1 (t-1)		Preseason Age-4 Harvest Rate <sup>a/</sup> Forecast		Postseason Age-4 Harvest Rate <sup>b/</sup> Estimate		Preseason Adult Harvest Forecast		Postseason Adult Harvest Estimate	
	Age-3	Age-4	Age-3	Age-4	Ocean	River	Ocean	River	Ocean	River	Ocean	River
1986	426,000	66,250	1,308,886	141,314	0.28	0.50	0.46	0.67	72,000	37,700	305,547	46,154
1987	511,800	206,125	786,492	343,391	0.28	0.53	0.43	0.44	121,200	78,200	279,890	73,265
1988	370,800	186,375	750,479	236,238	0.31	0.53	0.39	0.52	114,100	65,400	252,962	73,854
1989	450,600	215,500	367,039	176,281	0.30	0.49	0.36	0.70	128,100	67,600	123,985	54,340
1990	479,000	50,125	177,632	103,115	0.30	0.49	0.55	0.36	85,100	31,200	115,003	11,459
1991	176,200	44,625	69,558	37,265	0.13	0.28	0.18	0.45	16,700	12,800	9,969	13,581
1992	50,000	44,750	39,407	28,223	0.06	0.15	0.07	0.27	4,200	4,200	3,160	6,787
1993	294,400	39,125	164,687	14,972	0.12	0.43	0.16	0.49	20,100	22,500	11,264	12,808
1994	138,000	86,125	116,131	39,558	0.07	0.20	0.09	0.30	10,400	14,300	8,525	13,524
1995	269,000	47,000	767,678	27,591	0.07	0.32	0.13	0.20	13,500	18,500	31,302	21,638
1996	479,800	268,500	190,251	225,233	0.17	0.66	0.16	0.39	88,400	129,100	44,921	69,242
1997	224,600	53,875	140,261	62,830	0.10	0.43	0.06	0.26	17,600	26,500	8,620	17,763
1998	176,000	46,000	154,273	44,792	0.07	0.29	0.09	0.30	10,200	14,800	4,916	17,897
1999	84,800	78,750	128,830	30,065	0.10	0.28	0.09	0.45	12,300	18,100	5,085	16,942
2000	349,600	38,875	631,498	44,031	0.11	0.53	0.10	0.25	24,000	32,400	42,293	35,065
2001 <sup>c/</sup>	187,200	247,000	485,710	142,157	0.14	0.61	0.09	0.30	45,600	105,300	21,671	52,569

a/ Ocean harvest rate forecast is the fraction of the predicted ocean abundance expected to be harvested Sept 1 (t-1) through August 31(t). River harvest rate forecast is the fraction of the predicted river run expected to be harvested by river fisheries.

b/ Ocean harvest rate is the fraction of the postseason ocean abundance harvested Sept 1 (t-1) through August 31(t). River harvest rate is the fraction of the river run harvested by river fisheries.

c/ Preliminary.

Table 4. Numbers of hatchery and natural adult fall chinook spawners in the Klamath Basin by age, 1985 - 2001.

Year	Hatchery Spawners					Natural Area Spawners					Proportion Natural				
	Age 2	Age 3	Age 4	Age 5	Adults	Age 2	Age 3	Age 4	Age 5	Adults	Age 2	Age 3	Age 4	Age 5	Adults
1985					22,500					25,700					0.53
1986					32,900					113,400					0.78
1987					29,100					101,700					0.78
1988					33,500					79,400					0.70
1989					22,000					43,900					0.67
1990					8,100					15,600					0.66
1991	270	2,426	3,827	232	6,485	718	3,956	7,430	263	11,649	0.73	0.62	0.66	0.53	0.64
1992	3,948	2,576	4,627	157	7,360	5,143	3,051	8,657	321	12,029	0.57	0.54	0.65	0.67	0.62
1993	1,619	20,797	846	0	21,643	3,825	18,629	3,039	190	21,858	0.70	0.47	0.78	1.00	0.50
1994	5,200	7,877	6,702	160	14,739	6,245	22,230	9,879	224	32,333	0.55	0.74	0.60	0.58	0.69
1995	335	26,685	1,987	255	28,927	17,324	148,639	11,856	1,298	161,793	0.98	0.85	0.86	0.84	0.85
1996	792	4,360	15,649	24	20,033	6,174	17,232	64,048	46	81,326	0.89	0.80	0.80	0.66	0.80
1997	1,272	10,484	7,560	618	18,662	4,225	19,343	24,493	2,308	46,144	0.77	0.65	0.76	0.79	0.71
1998	595	20,411	8,588	220	29,219	2,855	30,509	11,462	517	42,488	0.83	0.60	0.57	0.70	0.59
1999	6,857	10,046	4,081	200	14,327	10,447	11,927	6,396	133	18,456	0.60	0.54	0.61	0.40	0.56
2000	1,909	87,641	9,833	138	97,612	6,394	70,042	12,565	121	82,728	0.77	0.44	0.56	0.47	0.46
2001	1,631	31,305	23,802	4	55,111	7,753	41,024	36,994	38	78,056	0.83	0.57	0.61	0.90	0.59

Table 5. Harvest levels and rates of age-three and age-four Klamath River fall chinook. (Page 1 of 2)

Year (t)	Ocean Fisheries (Sept 1 (t-1) - Aug 31 (t))							River Fisheries (t)		
	KMZ			North of KMZ	South of KMZ	Subtotal	Ocean Total	Net	Sport	Total
	Troll	Sport	Subtotal							
<b>HARVEST (numbers of fish)</b>										
<b>Age-Three</b>										
1986	35,821	4,894	40,715	74,248	123,456	197,704	238,419	8,100	18,100	26,200
1987	17,590	5,167	22,757	43,535	57,462	100,997	123,754	11,400	11,400	22,800
1988	15,707	5,071	20,778	23,762	106,770	130,532	151,310	12,500	15,600	28,100
1989	6,312	11,77	18,088	15,278	23,463	38,741	56,829	2,700	900	3,600
1990	81	4,442	4,523	37,070	11,163	48,233	52,756	1,300	1,400	2,700
1991	0	1,032	1,032	350	824	1,174	2,206	2,123	1,277	3,400
1992	0	0	0	970	0	970	970	970	251	1,221
1993	0	812	812	819	6,360	7,179	7,991	5,426	2,917	8,343
1994	41	573	614	0	3,267	3,267	3,881	4,543	971	5,514
1995	0	984	984	11,856	14,476	26,332	27,316	11,840	5,536	17,376
1996	0	0	0	0	9,137	9,137	9,137	12,363	3,661	16,024
1997	0	232	232	611	1,211	1,822	2,054	2,166	2,736	4,902
1998	0	6	6	296	467	763	769	2,231	5,781	8,012
1999	61	174	235	1,251	435	1,686	1,921	4,981	1,748	6,729
2000a/	409	3,286	3,695	8,846	25,200	34,046	37,741	22,458	4,893	27,351
2001a/	116	107	223	2,794	5,962	8,756	8,979	18,716	7,289	26,005
<b>Age-Four</b>										
1986	7,786	1,121	8,907	23,478	32,100	55,578	64,485	17,000	2,900	19,900
1987	21,803	4,442	26,245	71,367	49,019	120,386	146,631	41,000	8,500	49,500
1988	11,926	3,635	15,561	27,139	50,584	77,723	93,284	38,600	6,200	44,800
1989	5,935	9,625	15,560	31,975	16,298	48,273	63,833	41,000	7,700	48,700
1990	3,959	2,865	6,824	39,395	10,505	49,900	56,724	6,000	2,200	8,200
1991	0	1,007	1,007	1,530	4,174	5,704	6,711	7,593	2,016	9,609
1992	172	55	227	1,799	12	1,811	2,038	4,360	723	5,083
1993	0	0	0	850	1,606	2,456	2,456	3,786	243	4,029
1994	0	1,072	1,072	1,116	1,419	2,535	3,607	6,666	812	7,478
1995	0	224	224	1,758	1,703	3,461	3,685	2,957	481	3,438
1996	768	3,450	4,218	10,277	20,763	31,040	35,258	43,959	9,080	53,039
1997	3	170	173	460	2,972	3,432	3,605	8,734	2,586	11,320
1998	0	101	101	3,972	0	3,972	4,073	7,164	1,822	8,986
1999	15	379	394	1,655	694	2,349	2,743	8,789	494	9,283
2000	116	895	1,011	2,362	1,055	3,417	4,428	6,733	756	7,489
2001 <sup>a/</sup>	1,317	1,608	2,925	5,864	3,864	9,728	12,653	21,724	4,817	26,541

Table 5. Harvest levels and rates of age-three and age-four Klamath River fall chinook. (Page 2 of 2)

Year (t)	Ocean Fisheries (Sept 1 (t-1) - Aug 31 (t))							River Fisheries (t)		
	KMZ			North of KMZ	South of KMZ	Subtotal	Ocean Total	River Fisheries (t)		
	Troll	Sport	Subtotal					Net	Sport	Total
<b>HARVEST RATE</b>										
<b>Age-Three</b>										
1986	0.03	0.00	0.03	0.06	0.09	0.15	0.18	0.05	0.11	0.16
1987	0.02	0.01	0.03	0.06	0.07	0.13	0.16	0.13	0.13	0.25
1988	0.02	0.01	0.03	0.03	0.14	0.17	0.20	0.12	0.15	0.28
1989	0.02	0.03	0.05	0.04	0.06	0.11	0.15	0.05	0.02	0.07
1990	0.00	0.03	0.03	0.21	0.06	0.27	0.30	0.11	0.12	0.23
1991	0.00	0.01	0.01	0.01	0.01	0.02	0.03	0.21	0.13	0.34
1992	0.00	0.00	0.00	0.02	0.00	0.02	0.02	0.14	0.04	0.18
1993	0.00	0.00	0.00	0.00	0.04	0.04	0.05	0.11	0.06	0.17
1994	0.00	0.00	0.01	0.00	0.03	0.03	0.03	0.13	0.03	0.15
1995	0.00	0.00	0.00	0.02	0.02	0.03	0.04	0.06	0.03	0.09
1996	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.32	0.09	0.41
1997	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.06	0.08	0.14
1998	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.14
1999	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.17	0.06	0.23
2000 a/	0.00	0.01	0.01	0.01	0.04	0.05	0.06	0.12	0.03	0.15
2001 a/	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.19	0.07	0.26
<b>Age-Four</b>										
1986	0.06	0.01	0.06	0.17	0.23	0.39	0.46	0.57	0.10	0.67
1987	0.06	0.01	0.08	0.21	0.14	0.35	0.43	0.36	0.08	0.44
1988	0.05	0.02	0.07	0.11	0.21	0.33	0.39	0.45	0.07	0.52
1989	0.03	0.05	0.09	0.18	0.09	0.27	0.36	0.59	0.11	0.70
1990	0.04	0.03	0.07	0.38	0.10	0.48	0.55	0.26	0.10	0.36
1991	0.00	0.03	0.03	0.04	0.11	0.15	0.18	0.35	0.09	0.45
1992	0.01	0.00	0.01	0.06	0.00	0.06	0.07	0.23	0.04	0.27
1993	0.00	0.00	0.00	0.06	0.11	0.16	0.16	0.46	0.03	0.49
1994	0.00	0.03	0.03	0.03	0.04	0.06	0.09	0.27	0.03	0.30
1995	0.00	0.01	0.01	0.06	0.06	0.13	0.13	0.17	0.03	0.20
1996	0.00	0.02	0.02	0.05	0.09	0.14	0.16	0.32	0.07	0.39
1997	0.00	0.00	0.00	0.01	0.05	0.05	0.06	0.20	0.06	0.26
1998	0.00	0.00	0.00	0.09	0.00	0.09	0.09	0.24	0.06	0.30
1999	0.00	0.01	0.01	0.06	0.02	0.08	0.09	0.43	0.02	0.45
2000	0.00	0.02	0.02	0.05	0.02	0.08	0.10	0.22	0.02	0.25
2001 a/	0.01	0.01	0.02	0.04	0.03	0.07	0.09	0.24	0.05	0.30

a/ Preliminary data (incomplete cohort).

Table 6. Fall 2001 (September–November) estimated ocean landings of Klamath River fall chinook by fishery, age, and KOHM area.<sup>a/</sup>

COMMERCIAL FISHERY										
KOHM area	Age 3			Age 4			Age 5			Total
	Sept	Oct	Nov	Sept	Oct	Nov	Sept	Oct	Nov	
NO	--	--	--	107	59	--	--	--	--	166
CO	--	--	--	245	--	154	37	--	--	436
KO	--	--	--	161	--	--	23	--	--	184
KC	--	--	--	884	--	--	171	--	--	1054
FB	--	--	--	--	--	--	--	--	--	0
SF	--	--	--	50	--	--	--	--	--	50
MO	--	--	--	--	--	--	--	--	--	0
Total	--	--	--	1447	59	154	230	--	--	1891

SPORT FISHERY										
KOHM area	Age 3			Age 4			Age 5			Total
	Sept	Oct	Nov	Sept	Oct	Nov	Sept	Oct	Nov	
NO	--	--	--	--	--	--	--	--	--	0
CO	--	--	--	58	--	--	--	--	--	58
KO	--	--	--	73	--	--	48	--	--	121
KC	--	--	--	109	--	--	85	--	--	194
FB	--	--	--	--	--	--	--	--	--	0
SF	--	--	--	--	--	--	--	--	--	0
MO	--	--	--	--	--	--	--	--	--	0
Total	--	--	--	239	--	--	133	--	--	372

a/ KOHM areas are as follows: NO = north of Cape Falcon; CO = Newport and Coos Bay; KO= Klamath Management Zone in Oregon; KC = Klamath Management Zone in California; FB = Fort Bragg; SF= San Francisco; and MO=Monterey.

Appendix A. KOHM projection coupling 2002 ocean abundance and percent natural forecasts with 2001 management regulations. (Page 1 of 2)

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Harvest

Total:	97959													
Ocean:	29633													
River:	68327													
Tribal:	48980	0.500	(target: 0.500)											
Non-Tribal:	48980													
Ocean commercial:	23604													
CA / OR:	10065	/ 13539	0.426 / 0.574											
Ocean recreational:	6029													
KMZ:	4193	0.141	(target: 0.170)											
River recreational:	19347	0.395	(target: 0.395)											
Age-4 ocn harvest rate:	0.129		(target: <= 0.160)											

Escapement

Mature:	133415													
Spawners:	59854													
Hatcheries:	23075													
Natural Areas:	36778		(target: >= 35000)											
Absent fishing:	94843													
Nat. spawner reduction rate (vs no fishing):	0.612		(target: <= 0.631)											

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Harvest: commercial

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	107	59	0	0	0	0	0	485	735	305	664	1696	4051
CO	282	0	154	0	0	0	0	114	413	704	2725	2653	7045
KO	184	0	0	0	0	0	0	0	123	725	0	1411	2443
KC	1054	0	0	0	0	0	0	0	0	0	0	0	1054
FB	0	0	0	0	0	0	0	0	930	0	0	0	930
SF	50	0	0	0	0	0	0	0	1303	2650	1824	481	6308
MO	0	0	0	0	0	0	0	0	488	587	694	2	1772
Total	1677	59	154	0	0	0	600	3992	4971	5908	6243	23604	

Harvest: recreational

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	0	0	0	0	0	0	0	0	0	2	3	88	120
CO	58	0	0	0	0	0	0	0	9	64	181	14	325
KO	121	0	0	0	0	0	0	0	9	235	384	790	1539
KC	194	0	0	0	0	0	0	0	217	763	725	756	2654
FB	0	0	0	0	0	0	0	20	52	158	277	20	527
SF	0	0	0	0	0	0	0	69	27	244	312	9	660
MO	0	0	0	0	0	0	0	43	10	26	110	15	204
Total	372	0	0	0	0	0	0	132	326	1493	2076	1630	6029

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Appendix A. KOHM projection coupling 2002 ocean abundance and percent natural forecasts with 2001 management regulations. (Page 2 of 2)

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Days Open: commercial

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
NO	NA	NA	NA	NA	NA	0	0	0	30	31	30	23	29
CO	NA	NA	NA	NA	NA	0	0	0	30	31	30	23	29
KO	NA	NA	NA	NA	NA	0	0	0	0	31	0	0	0
KC	NA	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	NA	0	0	0	0	31	30	31	31
MO	NA	NA	NA	NA	NA	0	0	0	0	31	30	31	14

Days Open: recreational

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
NO	NA	NA	NA	NA	NA	0	0	0	30	31	30	31	31
CO	NA	NA	NA	NA	NA	0	0	0	30	31	30	31	31
KO	NA	NA	NA	NA	NA	0	0	0	0	15	30	16	31
KC	NA	NA	NA	NA	NA	0	0	0	0	15	30	16	31
FB	NA	NA	NA	NA	NA	0	12	31	30	31	30	31	31
SF	NA	NA	NA	NA	NA	0	0	0	17	31	30	31	31
MO	NA	NA	NA	NA	NA	0	0	1	30	31	30	31	31

Quotas: commercial

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA								
CO	NA	NA	NA	NA								
KO	NA	1500	NA	3000								
KC	NA	NA	NA	NA								
FB	NA	3000	NA	NA	NA							
SF	NA	NA	NA	NA								
MO	NA	NA	NA	NA								

Quotas: recreational

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA											
CO	NA											
KO	NA											
KC	NA											
FB	NA											
SF	NA											
MO	NA											

Size limits

	fishery	month	area	limit
1	10	9	SF	27
2	10	10	SF	27
3	10	11	SF	27
4	10	12	SF	27
5	10	7	SF	27
6	10	8	SF	27
7	10	9	MO	27
8	10	10	MO	27
9	10	11	MO	27
10	10	12	MO	27
11	10	7	MO	27
12	10	8	MO	27
13	40	2	FB	24
14	40	3	FB	24
15	40	4	FB	24
16	40	5	FB	24
17	40	4	SF	24
18	40	5	SF	24
19	40	6	SF	24
20	40	3	MO	24
21	40	4	MO	24
22	40	5	MO	24
23	40	6	MO	24